

Conformal twists, Yang-Baxter σ -models & holographic noncommutativity

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Abstract

© 2018 IOP Publishing Ltd. Expanding upon earlier results (Araujo et al 2017 Phys. Rev. D 95 105006), we present a compendium of σ -models associated with integrable deformations of AdS₅ generated by solutions to homogenous classical Yang-Baxter equation. Each example we study from four viewpoints: conformal (Drinfeld) twists, closed string gravity backgrounds, open string parameters and proposed dual noncommutative (NC) gauge theory. Irrespective of whether the deformed background is a solution to supergravity or generalized supergravity, we show that the open string metric associated with each gravity background is undeformed AdS₅ with constant open string coupling and the NC structure Θ is directly related to the conformal twist. One novel feature is that Θ exhibits 'holographic noncommutativity': while it may exhibit non-trivial dependence on the holographic direction, its value everywhere in the bulk is uniquely determined by its value at the boundary, thus facilitating introduction of a dual NC gauge theory. We show that the divergence of the NC structure Θ is directly related to the unimodularity of the twist. We discuss the implementation of an outer automorphism of the conformal algebra as a coordinate transformation in the AdS bulk and discuss its implications for Yang-Baxter σ -models and self-T-duality based on fermionic T-duality. Finally, we comment on implications of our results for the integrability of associated open strings and planar integrability of dual NC gauge theories.

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Keywords

AdS/CFT correspondence, sigma model, Yang-Baxter deformation

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